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DISEASES OF THE CHEST

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Editorial Comment

Shall we Spread or Eliminate Tuberculosis in the Army?

Our fighting forces are routinely examined physically and clinically for practically every serious defect except the most important one—most important for two reasons—first, because it is the most costly to the government and second, because it is the most deadly of all diseases in the age range of our fighters, from eighteen to forty-five.

It was very impractical economy to spend from one to several dollars each for a thirty minute medical and physical examination of four million fighting men, as we did in World War I, and to include no adequate provision for keeping tuberculous persons out of the military forces, only to spend a round billion dollars during the first twenty years thereafter for disability compensation and for hospitalization for tuberculosis.

Had it been possible and practical (which it was not) in 1917 and 1918 to x-ray the chests of all recruits, and of the entire military personnel, and so to have eliminated active cases of tuberculosis, this enormous bill would have been but a fraction of its present size—and the total is still growing at the rate of something like three million dollars a month—a sum sufficient to make a full 14x17 chest x-ray by the modern rapid paper film method, of the entire four million men in our World War forces.

When almost every active public health agency in the country, including more than two thousand anti-tuberculosis organizations affiliated with the National Tuberculosis Association, schools and colleges, many state departments of health, including the U. S. Public Health Service, are stressing and actively promoting the EDC (Early Diagnosis Campaign) throughout the country, the one organization which has more millions at stake than any other organization or agency or group in this or any other country, is "letting the matter ride."

If it's "good business," as has been amply proven over and over again for a city, a county, or a town, to go out and hunt for, and find, and segregate, and treat, cases of tuberculosis among its adult population, how much "better business" it would be for Uncle Sam to eliminate active tuberculosis from his military forces.

Once a recruit is finally accepted and has entered upon regular duties in the armed forces of our military establishment in time of war, the government, by law and by established practice, becomes the guardian of that individual to the end of his life, and some of

his dependents to the ends of their lives.

In selecting recruits, the primary object is to pick men *fit for the service*. A case of tuberculosis or of heart disease, whether incipient, moderately advanced, or far advanced, is not *fit for the service* by any standard. Yet we have never made adequate efforts to exclude these diseases either from the ranks or from the command of our forces. Until every individual has a chest x-ray, there is always the possibility—in fact there is a strong probability—that somewhere between one-half of one per cent and two per cent have either tuberculosis or cardiac abnormality or both, to a degree requiring attention or further investigation, without which they should not take on the strenuous life of a soldier or sailor.

Canada is now x-raying the chest of every recruit before final acceptance. Not only do they x-ray recruits upon enlistment, but they will again be x-rayed upon discharge.

Tuberculosis among Canadian World War Veterans has cost the Canadian Government over a hundred million dollars in disability compensation.

Do we intend, in this emergency, to put tuberculosis victims into our army so that they can infect their tentmates and buddies while they are in the service and later to fill our hospitals and sanatoria and add another billion dollars to our compensation costs? It need not be, It must not be.

F. W. B.

State Chapters of the College

In New York, at the 1940 Convention, there was ratified a change in the Constitution and By-Laws, which permits the granting of charters to State groups of Fellows of the College. It is stipulated that a meeting of such State Societies must be held at the time and place of the Annual Convention of the corresponding State Medical Society.

Three states have already organized. Chapter No. 1 is Illinois, No. 2 is New York and No. 3 is New Jersey. Pennsylvania is expected to organize at the time of the Convention of the State Medical Society in Philadelphia in October.

There are to be no dues in State Chapters.

F. W. B.

Associate Membership in the College

Associate Membership in the American College of Chest Physicians was established by addition to the Constitution and By-Laws of the College at the 1940 Convention. Doctors who have been working or training in pulmonary diseases for two years are eligible to apply for Associateship. They are required to pay the established $10.00 yearly dues, but no initiation fee. They must qualify and apply for Fellowship within 5 years, or their Associateship will be terminated.

Doctors wishing to apply for Associateship may secure application forms from the Chairman of the Board of Regents, Doctor Frank Walton Burge, 1930 Chestnut Street, Philadelphia, Pennsylvania. F. W. B.

Initiation Fee in the College

The Regents and Governors of the American College of Chest Physicians in joint meeting at New York City on June 8th, 1940, unanimously voted to raise the initiation fee for admission to Fellowship in the College, from $25.00 to $50.00 on January 1st, 1941. Increase to $100.00 on January 1st, 1942, is contemplated, as it is believed that the enormous amount of work required to build the College will be completed by that time, and ample opportunity will have been afforded qualified chest specialists to secure Fellowship.

F. W. B.

We Need More Mineral Counties

From Paul C. Rouzer, Superintendent of Schools, comes the very heartening statement that no teacher, janitor, bus driver, administrator or other employee of the Board of Education of the County of Mineral, West Virginia, has tuberculosis. What a great thing it would be, indeed, if there were many more Mineral Counties; and what a complete triumph for the hosts flying the banner of the double-barred cross if there were only such counties. No longer is it, as formerly, complacently accepted that universal infection exists. Except in the very congested metropolitan areas, the incidence of infection, as shown by the tuberculin test, is well below fifty per cent in

(Continued to page 210)

Chronic Bronchitis

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Introduction

With improved and improving methods of investigation and diagnosis, the ranks of pure chronic bronchitis are gradually thinning. Heretofore, there have been included in this category many instances of bronchiectasis, mycotic disease, the bronchial disturbance associated with asthma and other allergic manifestations, intra-bronchial growths, tracheo-bronchial tuberculosis and other disorders. A weakened myocardium may cause persistent rales at the lung bases, and the condition mistaken for chronic bronchitis. With the proper recognition and treatment of the failing circulation, the "bronchitis" (passive congestion) clears.

Even with the separation of the several entities, chronic bronchitis still remains something of a heterogenous group. A large percentage of the cases of chronic bronchitis have been proved, in recent years, to be cases of mild bronchiectasis. This has largely come about through bronchography—the making of x-ray films after the introduction of an opaque medium into the bronchi. An iodized oil is the medium usually employed for this purpose. The dilated bronchi, the cylindrical and saccular dilitations, are readily revealed in these bronchograms; whereas their presence could not be detected on the films as ordinarily made. Included also in this group are cases of bronchitis with special characteristics, such as fibrinous bronchitis, purulent bronchitis, membraneous bronchitis, etc.

Chronic bronchitis most often results from the structural and pathological changes incident to repeated and recurrent attacks of acute bronchitis. The association of infection in the upper respiratory tract with infection in the bronchial tubes is extremely common. This is notoriously true of infection of the para-nasal sinuses. It may be emphatically stated that no case of a chronic bronchial disorder has been competently studied unless an examination of the sinuses has been made. In many, many instances, the sinus disease is the fountain head of the infection in the bronchi; and little headway can be made in the treatment of the latter until the former is eradicated. In children, infected adenoids and tonsils are often associated with, and responsible for, the bronchitis.

A chronic or recurrent bronchitis is a frequent accompaniment of chronic lung affections. The author has seen many cases of pulmonary tuberculosis with an accompanying benign bronchitis. Emphasis must be placed upon the word benign, in sharp contrast to the very serious tracheo-bronchitis which is due to an invasion of the bronchial tubes by the tuberculosis. In the consideration of a chronic bronchitis in association with pulmonary tuberculosis, it would be important to make the differentiation. The diagnosis of tuberculous tracheo-bronchitis usually demands a bronchoscopic examination. The course of the tuberculosis does not seem to be particularly unfavorably influenced by the benign variety. The chief difficulty, rather, seems to fall to the lot of the physician. He must determine how much of the cough, wheezing and expectoration is due to the bronchitis; and how much is due to the tuberculosis. Sputum and x-ray examinations are very valuable in this connection.

As with acute bronchitis in measles, so it is with recurrent bronchitis in asthma. It is part of the affection. High pitched squeaks at the end of expiration are a characteristic finding in asthmatic bronchitis; and when heard, should direct the physician along this path of inquiry.

Chronic bronchitis is particularly prevalent among the elderly. It is usually the cause of the winter cough and the frequent chest colds in changeable weather. Over-exertion, getting overheated followed by a sudden cooling off, or subjecting the body to any decided temperature changes, provokes an aggravation of the symptoms. For years, the bronchitis may be manifest only in the winter months; with a return to an apparently normal state in the summer. With succeeding years, the bronchitis becomes increasingly severe and persists for a longer time after the advent of summer; until a time may be

reached when it remains around the calendar. Simple chronic bronchitis is not a common ailment in young people.

The bronchial irritation seen in the excessive and habitual smoker is a condition that, to the author's way of thinking, has not been sufficiently stressed. For a long time the so-called "cigarette cough" was largely considered to be the erroneous explanation proffered by the patient who was, in reality, afflicted with pulmonary tuberculosis. Of course this is the case only too frequently, particularly regarding the slight hacking cough; but it is to be emphasized that there is a true smoker's cough. With the advent of an increasing number of women smokers, the condition is definitely on the ascendency; and it would appear that it is more prevalent among them. This may be due to the fact that they have only recently been emancipated from the shackles of convention; and indulge in the weed with less tolerance and, perhaps, with less discretion. It is a common sight to see a woman light a fresh cigarette from the one just consumed. This is a comparatively uncommon thing for a man to do. The pathological state is a bronchial catarrh, and is characterized by cough and the production of considerable muco-purulent sputum. This sputum is usually grey, or greyish-black due to the contained carbon. It may at times be expectorated in the form of small balls or bronchial casts. This productive cough occurs off and on, at any time; but is greatest during the evening and during the first hour or two in the morning after arising. The condition usually responds favorably to the control of the smoking habit, and in proportion to the degree and effectiveness with which this control is applied. To obtain the best results, a removal from the smoke-laden cities may be necessary.

Symptoms and Course

Chronic bronchitis usually results from repeated attacks of acute bronchitis which have become more frequent and more prolonged. There occurs a transitional phase which may be nicely called sub-acute bronchitis. This partakes of the characteristics of both the acute and chronic bronchitis. In some instances, the disease may be chronic from the beginning. Except when complications arise, chronic bronchitis is rarely fatal. A duration of ten to twenty years, or more, is not uncommon. The disease may be quite mild, and little impairment of the health may be experienced, other than temporary disability at the time of acute exacerbations. In other cases, it may be more severe and result in invalidism and confinement within doors for months at a time. Bronchiectasis, marked emphysema and failure of the right heart, are the more common complications. These may, in turn, produce symptoms of a severe or urgent nature.

Cough is by far the most common symptom of chronic bronchitis, being practically a constant accompaniment. The winter cough, in mild cases, may be about the only symptom. The winter cough of elderly people falls into this category. Sudden changes in the weather, exposure, contact with irritating dust and gases, may provoke attacks or periods of coughing. Over-exertion, getting overheated, and even loud talking and laughing may be followed by a paroxysm of cough. It is regrettable that such a wholesome thing as a good hearty laugh should be penalized. Surely, every reader can recall the jolly rotund individual, perhaps with just a flare for the cocktail and cigar, laughing himself into a fit of coughing, accompanied by a violaceous suffusion of face and neck and shortness of breath.

The expectoration in chronic bronchitis varies tremendously, both in character and amount. There is a rather troublesome type of chronic bronchitis with no expectoration, or at most only a small amount of tenacious mucous. It has been called dry bronchitis, or the catarrh sec of Laennec. In other cases, there is a bronchorrhea with the production of a copious, thin expectoration. Usually, the expectoration in chronic bronchitis consists of a moderate to a considerable amount of frothy mucoid or muco-purulent sputum. Large amounts of purulent sputum suggests bronchiectasis or lung abcess, rather than chronic bronchitis. There is no odor to the sputum in the uncomplicated cases of bronchitis. Likewise, coughing up blood is rarely seen in pure bronchitis. A few blood streaks in the sputum may result from a very severe spell of coughing. The presence of blood in the expectoration, in either large of small amounts, suggests the existence of some other disorder. Except in the acute exacerbations

and in the presence of complications, chronic bronchitis runs an afebrile course. Dyspnoea, in some degree, is present in most cases of chronic bronchitis. In the early phases of the disease, breathlessness may be occasioned only by exertion. Later in the course of the disease, it becomes more readily provoked and more pronounced. In chronic bronchitis of long standing, the dyspnoea is usually due to the associated emphysema and to strain upon the right heart.

There is little or no derangement of the gastro-intestinal tract in chronic bronchitis. The appetite may be impaired in some cases; but as a rule it is not. Eating may precipitate a coughing spell; and vomiting is not uncommon after such a spell. There is rarely any loss of weight from the affects of chronic bronchitis; but rather, the imposed sedentary life often results in a weight gain. Chest pain is uniformly absent. Even the sub-sternal discomfort and rawness of acute bronchitis is not experienced.

Diagnosis

The important thing in the diagnosis of chronic bronchitis is the differentiation from other chest disorders which may produce a chronic cough. It is a fairly safe assumption that in the case of an individual who has had a chronic productive cough over a period of years, and in whom there has been little impairment in the general health; that one is dealing with a chronic bronchitis. This is particularly true where the evolution of the disturbance has been from frequently repeated chest colds. If then, the physical signs are few or consist of scattered mucous and sibilant rales, the probability of this diagnosis is considerably enhanced. The diagnosis is safely established when examination fails to reveal any evidence of the other more specific diseases in which a chronic cough may be a dominant symptom. The chief ones in this group are tuberculosis, bronchiectasis, pulmonary mycosis, pneumonoconiosis, lung abscess and bronchogenic carcinoma. Epoch-making advances in the differential diagnosis in broncho-pulmonary diseases have been made by lung mapping following iodized oil injections.

More and more in recent years, the bronchoscope has come into its own; and has taken an important place among the diagnostic procedures. Its employment has also contributed to the reduction in the diagnoses of chronic bronchitis. Bronchoscopy is indicated in all atypical or obscure broncho-pulmonary disorders; and may prove, in many instances, the cause to be a growth, a foreign body or perhaps a suppurative process. Not infrequently, a case of so-called chronic bronchitis will prove to be circulatory in nature. If the weakness or failure in the pulmonary circulation is repaired, the bronchitis improves or disappears.

Wherever any chronic pulmonary disorder exists, pulmonary tuberculosis must be kept in mind. Usually, a chronic cough for a number of years, with little or no impairment of the general health, is not due to tuberculosis. It may be, however. Tuberculosis, as Syphilis, is a great imitator, and unless it is kept in mind, many cases will be missed. The late Dr. Lawrason Brown is credited with the dictum: "The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind."

In the examination of adult contacts of children with a positive tuberculin test, the "bronchitis" of the parent, uncle or grandparent may be shown to be tuberculosis. In every case of chronic cough, it is an excellent rule to make an x-ray of the lungs and to repeatedly examine the sputum.

Treatment

The prevention of exacerbations is one of the most important phases in the management of chronic bronchitis. In a large measure, this is accomplished by keeping the patient indoors during the changeable weather of winter and spring. The sojourn in a suitable climate during the fall and winter months, if the patient can afford it, is very helpful. The sunny climes of Florida and the south-western part of the United States, seem to be excellent for this purpose. For the milder cases, and the more rugged individuals, a high dry climate such as the Rocky Mountain area, seems well suited. The low humidity is a beneficial factor. The elderly, and those with a severe disturbance, however, do not tolerate the high altitudes well. Many cases with scant or no expectoration, experience relief at the sea coast. The sufferers from chronic bronchitis should always dress warmly, and not change from their heavy underclothes until

warm weather is definitely established.

Drugs play only a minor role in the treatment of chronic bronchitis, and probably no case is ever cured by them alone. Tonics of various kinds may aid, such as those containing iron, arsenic and strychnine. In the young and poorly nourished, cod liver oil is helpful and may be given throughout the fall and winter seasons. Many of the vitamin preparations, with which the market today is flooded, are probably helpful, particularly those containing vitamins A and D. Calcium has its advocates and apparently is given with benefit in some of the wheezy and allergic cases. The writer finds di-calcium phosphate, in doses of grs. XV three times a day, a satisfactory preparation. In those cases with emphysema and a weak myocardium, small doses of digitalis and strychnia are serviceable. Anodynes, such as codiene, are to be avoided; since their use in so chronic a disorder can possibly invite addiction. At times, in severe episodes they are necessary for relief. Numerous expectorants are prescribed in chronic bronchitis, and their selection should depend on the amount and character of the expectoration. None should be used over any protracted period. One of the best expectorants is potassium or sodium iodide in 2 to 5 grain doses 3 to 4 times a day. Watchfulness for an idiosyncracy or sensitiveness to iodine should be observed. Ammonium chloride or carbonate is useful where the secretions are scant or tenacious. The following is an old, tried and proved formula:

Amonium chloride 3 (or drams) VI
Brown Mist. qs. 3 (or ounces) VI
M. Sig:—one teaspoonful q. 3 hrs.

The alkaline expectorants, for example the acetate and citrate of potassium, are quite helpful, and may be given in hot water or milk. Given thus, in a hot drink on arising, they often prove most comforting to the patient. They are especially indicated in the gouty, rheumatic and obese individuals. For purulent, fetid and excessive secretions, the balsamic and mildly antiseptic preparations are usually employed. The commonly used drugs in this group are creosote, eucalyptol, tar, guiacol, benzoin and turpentine.

Medicated vapors, applied in various ways, are very popular in the general therapeutic management of chronic bronchitis. The methods of application range from the atomizer and mechanical inhaler to bits of filter paper, soaked in the medicant, placed about the sick room. Various breathing exercises and devices have been used to tone the musculature of the respiratory mechanism, to increase the tidal air, and to aid in the expulsion of secretions. Cold water douches on the chest, followed by vigorous rub-downs is another helpful measure. This, as well as other exercises, should be reserved for the mild cases or for remissions. Other procedures that have been employed in treating chronic bronchitis and which undoubtedly have some merit, are: vaccines, heliotherapy and deep x-ray therapy. The cases must be selected.

For the best results in the habitual and excessive smoker, a sharp curtailment, or better, a complete abstinence from smoking is necessary. The complete disappearance of a chronic cough by this alone, has been observed many times.

Finally, there needs to be stressed the value of periodic injections of iodized oil into the bronchi. It has proved to be one of the most helpful therapeutic agencies in the author's experience. Five to ten c.c. of the oil are injected into each side every two to four weeks.

In the prophylaxis of chronic bronchitis, careful attention should be paid to such factors as proper housing, clothing, exposure and exercise. It is particularly important that proper attention be given to foci of infection in the sinuses, nose and throat. The association of infection in the sinuses with infection in the bronchial tubes is extremely frequent. The prompt and energetic treatment of the sinus infection may prevent many individuals from developing chronic bronchial disease, or may markedly alleviate the affection after it is established.

Schedule for Teaching Chronic Diseases of the Lungs in Medical Schools

As Outlined by the Committee on Undergraduate Education Representing the American College of Chest Physicians

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This schedule was arranged on the basis that tuberculosis is not an acute disease. That is, it is not a disease of a few weeks; consequently, its diagnosis, treatment, prevention, and ultimate outcome cannot be understood by a short period of study. On the other hand, since this disease is characterized by many and varied changes for months and years, it must be taught to the students as it presents itself, that is over a period of months and years.

The schedule deals primarily with outlining a course for the study of pulmonary tuberculosis, since tuberculosis is the outstanding chronic disease from the standpoints of medicine and public health. The schedule, however, does allow opportunity for the student to obtain a working knowledge of other chronic diseases of the lungs. Again, the student who has been well grounded in tuberculosis will, as a physician, be lung conscious and will have an interest in, and an understanding of lung conditions in general.

A review of the work, carried on as it is at the present time, in the different medical schools, indicates that the bacteriology, pathology, and perhaps to a less extent, such other features of tuberculosis as immunology and allergy are being taught with a fair degree of satisfaction by most schools during the first and second years. There are some schools in which improvement in this particular work can be made through arranging the courses so as to call attention more specifically to these factors as they relate to tuberculosis.

An excellent practice carried out by some schools during the first or second year is the showing of some of the National Tuberculosis Association educational pictures such as "Behind the Shadows," "Let My People Live," "On the Firing Line," and "Cloud in the Sky." Pictures such as these may, and no doubt do, stimulate in some students, at least, an interest which they will maintain throughout their work.

The schedule specifically provides for 18 formal one-hour lectures covering the fundamentals of tuberculosis in a logical order and in as much detail as time permits. These lectures are to furnish the groundwork for the course in tuberculosis. They are to be given by an instructor specializing in the field covered by any particular lecture. It is suggested that nine of these lectures be given at the beginning of the course for the junior year and nine at the beginning of the course for the senior year. The remaining hours of the course are to be spent in informal periods to be spread over the last two years.

As part of the schedule, a special group of patients representing the various types of tuberculosis are to be selected from the teaching material at the beginning of both the junior and senior years. This group of patients is to be used for follow-up and repeated observation work throughout each year.

In the schedule it is suggested that the first part of the informal periods should be devoted to a discussion or seminar, the length of this time depending on the total amount of time allotted to the course in the particular school. During this discussion or seminar the instructor will be able to contact the student on a more or less individual basis and under conditions where there will be freedom from the ordinary tension of the classroom. During this part of the sessions, the work covered thus far in the course should be reviewed and the work yet to be taken up should be introduced in its logical order as suggested in the outline.

A second part of the informal period should be spent in seeing patients in chest clinics or sanatoria where diagnosis, case finding, and the sociological aspects should be par-

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ticularly emphasized. If the school is not fortunate enough to have a chest clinic or a sanatorium, this work may be carried on, though perhaps less satisfactorily, in special tuberculosis wards of public hospitals. This committee feels that the patients promiscuously placed in medical wards of public hospitals are in a situation that is obviously so out of keeping with the rational handling of pulmonary tuberculosis that, as teaching material, such patients are worse than no material at all, except perhaps to demonstrate certain more or less isolated factors. Under such conditions, the patient has little or no chance to overcome his disease and tuberculosis at its worst is being presented to the student. The usual reaction on the part of the student to attempts at teaching under such conditions is that he wants to avoid the disease as much as possible for the remainder of his life.

The final part of each informal period should be spent in reviewing the condition of those patients who have been selected for follow-up observation and study.

This schedule recognizes the importance of a student's spending some time, the amount depending again on the total time allotted for the course, with the nurse or physician or with both, in so-called field work, studying the sociological features and home treatment of tuberculosis.

Inasmuch as pulmonary tuberculosis continues to be such a serious health and medical problem and since its solution depends upon the man in the general practice of medicine, this schedule is arranged in an attempt to provide conditions in all our medical schools whereby graduates will be tuberculosis conscious and will have a lasting appreciation and practical working knowledge of the value and technique of early diagnosis, of the value and technique of an efficient case finding program, and of the value and technique of early and intensive treatment. Experience very definitely proves that if the general practitioner does not get such a training in school, there is very little likelihood that he will get it after graduation.

Is it not reasonable to expect that, if medical schools are to fulfill their place in our educational system, they should devote effort and time to the particular subjects in their curricula in proportion to the importance of those subjects as medical and health problems?

Those who prepared this schedule are aware that the subject of tuberculosis comes up repeatedly, especially in differential diagnosis, in every branch of medicine and surgery taught in medical schools. They feel, however, that past experience has very clearly demonstrated that students cannot be taught a practical working knowledge of tuberculosis except through a definite, logically arranged system together with certain equipment by which teaching material can be furnished, and with teachers especially equipped through experience and training, and, finally, by an allotment of time to the subject equal at least to that suggested in the minimum schedule. The committee feels that tuberculosis may and should be included in the department of internal medicine but, if such is the case, it should have a sub-department. Experience again has very definitely demonstrated that unless such a plan is followed, the average student leaves school with very little more practical understanding of this disease than when he entered.

The schedule as outlined is arranged according to a minimum number of hours for the course. Suggestions are also made for a schedule with the maximum number of hours. The number of hours in this minimum schedule is 76—divided as follows: 12 hours during the first and second years, 19 hours during the junior year, and 45 hours during the senior year. The number of hours in the maximum schedule is 185—divided as follows: 24 hours during the first and second years, 45 hours during the junior year, and 117 hours during the senior year.

The hours suggested for the first and second years are to be spaced and occupied according to the discretion of those in charge.

It is felt that in an attempt to teach the subject in any school, the time allotment should at least equal that suggested in the minimum schedule. Obviously, there is no objection to exceeding the number of hours suggested in the maximum schedule.

One medical school which is widely known for the efficient manner in which it teaches the subject of tuberculosis allots a total of 500 hours to the teaching of this subject. Another school, rated among the ten which are now doing the most acceptable work in

the teaching of chronic diseases of the lungs, estimated that they devoted four per cent of the total teaching time to tuberculosis. For the minimum schedule which we have suggested the time is roughly two per cent, and in the maximum schedule, four and one-half per cent of the total teaching time in the average medical school.

The time suggested for the maximum schedule was arrived at by averaging the number of hours devoted to the subject in the ten schools which, by the questionnaires they returned, indicated the greatest number of hours devoted to this subject. In averaging the number of hours in the ten schools which indicated the least number of hours devoted to this subject we found that the average was so low that it would be entirely inadequate for the teaching of this subject, so an arbitrary number of hours was worked out for a minimum schedule.

The shortage of time allotted to the subject was more apparent than real in many of these schools, as they are attempting to teach this subject as a part of other courses, especially internal medicine.

Where the total amount of time allotted to the teaching of tuberculosis and other chronic diseases of the lungs in any school is greater than that in the minimum schedule, the same general plan that is suggested in the schedule should be followed, and more time can be devoted to the various phases of the subject and additional informal sessions can be held. In the junior year, with more time, the work could perhaps be spread over the whole year and be given in two-hour periods twice a month or four-hour periods once a month.

If in attempting to put this schedule into operation in any particular school, only one instructor is available, the committee feels it would be better for him to carry the class along as a whole rather than break it up into sections and meet each section only a few times over a short period. As has already been stated, tuberculosis cannot be taught to students in a short period of time. If the one instructor should have the time, the class could be divided into smaller sections and he could then meet the different sections on different days of the month or week, as the case might be, as determined by the total amount of time allotted for the course. Under this system it is obvious that more satisfactory teaching could be done than where the instructor meets the whole class at one time.

Where a number of competent instructors are available, it is better to break the class up into sections of from six to fifteen. The smaller the group, the more individual attention can be given to the student and, consequently, the better the teaching.

As to clinical clerkships, this is a good method of teaching tuberculosis, if used as a supplement to the course as outlined in this schedule. If used as the principal means of teaching this subject, we are again confronted with the problem of trying to teach a chronic disease in a few weeks.

The committee urges that all students, on entering, be tuberculin tested and those reacting positively be x-rayed then and at the beginning of each school year. It further urges that the tuberculin tests be repeated at the beginning of each year on all those who had a previous negative reaction and, if and when they become positive, that they be x-rayed then and at the opening of each remaining year of school.

In conclusion, it is obvious that the successful operation of the suggested schedule necessitates certain requirements; namely, equipment by which adequate teaching material will be furnished, the best form of this equipment being out-patient chest clinics and sanatoria, and acceptable, but less satisfactory, tuberculosis wards in public hospitals where these wards are conducted under intelligent supervision and, as far as possible, with a sanatorium atmosphere. There must also be available teachers who through training and experience are competent to teach the subject.

In presenting this plan your committee realizes that some medical schools will have to take their teachers as they come, and that lack of experience, as well as lack of adequate equipment and teaching material, will be a serious handicap in the case of at least some schools. It is hoped, however, that the method of teaching suggested will stimulate improvement along these lines.

Your committee also feels that this proposed plan is sufficiently rigid to induce instructors, who may be lacking in experience and vision, to follow a more or less definite procedure and at the same time it will permit

digression so that the important factors in the handling of chronic diseases of the lungs can be emphasized throughout the course.

FORMAL LECTURES TO BE GIVEN DURING THE THIRD YEAR

Lect. I—Epidemiology of Tuberculosis — to be given by a chest specialist.

Historical.
Importance.
Morbidity.
Prevalence of Infection.
Clinical Significance of Infection.
Mortality from Tuberculosis.
Forms of Tuberculosis.
Factors Influencing Mortality.
Inheritance.

Lect. II—Bacteriology: The Newer Biology of the Tubercle Bacillus—to be given by a bacteriologist.

Historical and General Considerations.
Acid-fast Bacteria.
Variability.
Clinical Significance of Nonacid-fast Form.
Tubercle Bacillus in the Blood.
A typical Tubercle Bacilli.
A typical Pathological Responses.
Allergic and Immunological Considerations.

Lect. III—The Pathology of Pulmonary Tuberculosis—to be given by a chest specialist or pathologist with extensive experience in tuberculosis.

Introduction,
Histopathology of Pulmonary Tuberculosis.
Different Forms of Pulmonary Tuberculosis.
The Tuberculosis Primary Lesion,
1. Primary Complex of Ranke.
2. Stage of Generalization.
3. Stage of Isolated Tuberculosis.

Progressive Pulmonary Tuberculosis,
A. Acinous-Nodose Tuberculosis.
B. Caseous Pneumonia.
C. Indurative Tuberculosis.
D. The Tuberculous Cavity.

Pulmonary Hemorrhage in Tuberculosis.
Changes in Lymph Nodes.
Pulmonary Changes in Late Generalization.
Tuberculosis of the Pleura.

Lect. IV—Pathologic Physiology of the Tuberculous Lung—to be given by a physiologist or chest specialist.

Functional Disturbances,
1. Mechanics of Respiration,
(a) Respiratory Movements of Chest.
(b) Diaphragm—Mechanism of Cough.
(c) Respiratory Movements of Lung.
(d) Action of Bronchial Muscles.
2. Physiology,
(a) Gas Exchanges in the Lung.
(b) Dissociation of Oxyhemoglobin.
(c) Dissociation of CO_2.
(d) Regulation of Respiration.
(e) Gas Exchanges in Pleural Cavity.
3. Pathological Physiology,
(a) Gas Absorption.
(b) Tuberculous Cavities.
(c) Atelectasis and Fibrosis.
4. Mechanics of Cure.
5. Intrapleural Pressures,
(a) Pneumothorax.
(b) Gas Analysis.
(c) Physiology of Thorocoplasty.

Lect. V—Diagnosis of Tuberculosis by Laboratory Tests—to be given by a bacteriologist.

Laboratory Diagnosis.
Staining Methods for Tubercle Bacillus.
Animal Inoculation.
Cultivation of Tubercle Bacilli,
Methods and Media.
Differentiation of Human, Bovine and Avian Bacilli.
Serological Diagnosis of Tuberculosis.
Tuberculin Testing,
Nature of Tuberculin.
Nature of Reaction.
Clinical Application of Tuberculin.
Specificity of Tuberculin Reaction.
Errors in Interpretation.
Diagnostic Methods.
Technique of Tuberculin Tests.
Value of Tuberculin Testing.

Lect. VI—*Physical Diagnosis in Pulmonary Tuberculosis—to be given by a chest specialist.

Inspection.
Palpation.
Percussion.
Auscultation,
Normal.
Pathologic.
Adventitious Sounds.
The Stethoscope.
History Taking.
Symptoms of Toxemia.
Reflex Symptoms.
Fistula in Ano.
Symptoms of Pulmonary Decomposition.
Physical Examination.
X-ray Examination.
Laboratory Examination.

Lect. VII—Classification of Pulmonary Tuberculosis (Primary Type)—to be given by a chest

* The committee suggests that a little booklet entitled "Diagnostic Standards," published by the National Tuberculosis Association, be given to each student at this stage in his course. These can be secured by writing to the national office in New York.

specialist.

X-ray Findings.
Diagnosis.
Differential Diagnosis.
General Discussion of Primary Tuberculosis and Its Relation to Secondary Tuberculosis.

Lect. VIII—Classification of Pulmonary Tuberculosis (Secondary Type)—to be given by a chest specialist.

Pathogenesis,

1. The Exudative Reactions.
2. The Productive Forms.

Classification of Adult Type of Tuberculosis.

Aschopp's Classification,

1. Benign Acute Pulmonary Tuberculosis.
2. Exudative-Productive Tuberculosis.
3. Caseous-Pneumonic Tuberculosis.
4. Chronic Productive Tuberculosis.
5. Endobronchial Tuberculosis.

Lect. IX—X-ray Findings in Secondary Pulmonary Tuberculosis—to be given by x-ray man doing only chest work or by chest specialist.

Physical Structure of Chest.
Hilum and Trunk Markings of the Lung.
Advance of Disease by Extension and Reinfection.
X-ray Evidence of Activity, Chronicity, Healing.
Evidences of Caseation; Cavitation; Ulceration.
Evidences of Arrest; the Near-healed Stage; Healed Tuberculosis.
Importance of Serial X-ray Studies for the Early Recognition of Cavity.
Classification as to the Extent of Involvement.
Role of X-rays in Classifying Tuberculosis.
Parallelism between Clinical, Roentgenological and Pathologic Findings.
The Term "Peribronchial Tuberculosis."
Basal Tuberculosis in Adults.
The Paradox of Positive Sputum with Negative X-ray Findings.
Summary of X-ray Value in Adult Pulmonary Tuberculosis.
Mistakes Most Often Made in X-ray Diagnosis.

*OUTLINE OF INFORMAL WORK DURING THE THIRD YEAR**

1. First two-hour period,
   a. *First hour:* Discussion or seminar in review of epidemiology, bacteriology, and pathology of tuberculosis.
   b. *Second hour:* To be spent in the out-patient department of chest clinic, or sanatorium, or tuberculosis ward of a public hospital and to be devoted to the observation of patients and selection of a certain group that will be studied especially from the standpoint of diagnosis beginning with the history and followed by physical examination, laboratory findings and x-rays.
2. Second two-hour period,
   a. *First hour:* Discussion or seminar devoted to pathological physiology of tuberculosis and chronic lung diseases, laboratory tests in the diagnosis of tuberculosis and physical examination as related to the diagnosis of chest conditions.
   b. *Second hour:* Devoted to study of selected group of patients demonstrating to the students as far as possible the above factors discussed during the first hour as they relate to these patients.
3. Third two-hour period,
   a. *First hour:* Discussion or seminar devoted to classification of pulmonary tuberculosis.
      1. Primary.
      2. Secondary.
   b. *Second hour:* Devoted to study of patients in out-patient chest clinics, sanatorium, or special wards with special reference to classification of tuberculosis and to observation of the selected group of patients.
4. Fourth two-hour period,
   a. *First hour:* Discussion or seminar on x-ray films of normal chest and interpretation of film of abnormal chest.
   b. *Second hour:* Devoted to examination of patients covering as far as possible all the phases of diagnosis, and to observation of the selected group of patients.
5. Fifth two-hour period,
   a. Two hours devoted to study of patients from the standpoint of diagnosis including history, physical examination, laboratory findings and x-ray films of the chest, that is, review of all the work so far.

FORMAL LECTURES TO BE GIVEN DURING THE FOURTH YEAR

Lect. I—Differential Diagnosis—When x-ray and Physical Findings are Slight and Indefinite, the Following Conditions to be Considered—to be given by a chest specialist.

Accessory Nasal Sinus Disease.
Influenza and Allied Streptococcic Infections.
Undalant Fever.
Heart Disease.
Pulmonary Ameobiasis.
Trichiniasis.
Hyperthyroidism.
Neurasthenia.
Various Focal Infection.
Chronic Bronchitis and Pulmonary Emphysema.
Asthma.
Kidney Disease.
Gall Bladder Disease.

* As has been suggested elsewhere, if possible there should be available at least a small group of patients, preferably in a sanatorium or a special ward, that can be followed along by the class and to which the different phases of tuberculosis, which have been studied so far, can be applied.

Diabetes.
Typhoid Fever.
Hodgkins' Disease.
Various Secondary Anemias.
The Leukemias.

Lect. II—Differential Diagnosis When X-ray and Physical Findings are Moderate or Marked, the Following Conditions to be Considered—to be given by a chest specialist.

Bronchiectasis.
Lung Abscess.
Pulmonary Syphilis.
Pneumoconiosis.
Foreign Bodies.
Benign or Malignant Tumors.
Mediastinal Tumors.
Actinomycosis.
Blastomycosis.
Coccidiocal Granuloma.
Aspergillosis.
Hyatid Disease.
Pulmonary Distomiasis.
The Pneumonias.
Pleural Effusion.

Lect. III—Prognosis in Pulmonary Tuberculosis —to be given by a chest specialist.

General Considerations.
Depends Primarily on Manner of Treatment.
Clinical Types.
Relative Value of Physical Signs and Symptoms.
Complicating Disease Conditions.
Non-tuberculous Pulmonary Complications.
Extra-tuberculous Involvements.
Other Factors.
Prophylaxis,
  Introduction.
  The Sputum.
  The Open Case.
  Prophylaxis in Childhood.
  Acquired Artificial Immunization.
  Marital Tuberculosis.
  The General Hospital in Care of the Tuberculous.

Lect. IV—Treatment of Pulmonary Tuberculosis —to be given by a chest specialist.

Economic Factors.
Home Environment,
  General Considerations.
Personal Hygiene.
Non-Surgical Rest, Exercise and Occupation
  Rest,
    Methods of Obtaining.
  Rest and Exercise.
  Graduated Exercise.
  Future Occupation.
Diet,
  General Considerations.
  Obesity and Tuberculosis.
  The Menu.
  Special Diets.

Salt Restricted Dietaries in Tuberculosis,
  Characteristics.
  Theoretical Foundations.
  Clinical Results.
  Practical Applications.
  A New Modification.
  Mechanism.
  Conclusions.

Lect. V—Treatment of Pulmonary Tuberculosis (Con't.)—Medicinal, Symptomatic, and General Therapy—to be given by a chest specialist.

Specific Therapy,
  Metallic Salts.
  Calcium.
  Vitamin D.
  Creosote and Guiacol.
  Iodine.
  Liver Extract.
Treatment of Symptoms.
Tuberculin Therapy,
  Varieties of Tuberculin.
  Indications.
  Contra-indications.
  Technic.
Heliotherapy,
  Physical Properties of Light.
  Biologic and Physiologic Effects of Light.
  Light Sources.
  Technique of Exposures.
  Clinical Applications of Heliotherapy.
Climate Therapy,
  General Considerations.
  Favored Localities.
  Climate and Extra-pulmonary Tuberculosis.

Lect. VI—Treatment of Pulmonary Tuberculosis — (Con't.) — Artificial Pneumothorax — to be given by a chest specialist.

Introduction.
Historical.
Mode of Action.
Indications.
Contra-indications.
Selection of Cases.
Technique and apparatus.
Control of the Pneumothorax.
Complications.
Pleuritic Adhesions.
Influence on Contralateral Lung.
Influence on Symptoms.
End-Results of Treatment.
Classifications of Pneumothorax Character.
Summary.

Lect. VII—Treatment of Pulmonary Tuberculosis —(Con't.)—to be given by a chest surgeon.

Intrapleural Pneumolysis,
  Limitation.
  Indications for Operation.
  Contra-indications.
  Selection of Cases.
  Surgical Anatomy.

Pleuritic Adhesions.
Operative Technique.
Complications.
Result of Treatment.
Conclusions.
Oleothorax,
Indications.
Contra-indications.
Technique.
Pneumothorax Pleuritis.
Complications.
End Results.
Phrenic Neurectomy,
Indications.
Operative Procedures.
Choice of Operations.
Complications.
Clinical Effects.
Results.
Summary and Conclusions.

Lect. VIII—Treatment of Pulmonary Tuberculosis—(Con't.)—to be given by a chest surgeon.

Extra Pleural Thorocoplasty,
The Evaluation and Principles of Treatment of Cavities.
Indications.
Surgical Procedures,
Technic.
Post-operative Treatment.
Complications.
Results.

Lect. IX—Treatment of Other Chronic Diseases of the Lungs by Surgery—to be given by a chest surgeon.

Indications.
Techniques.

FOURTH YEAR INFORMAL SCHEDULE ACCORDING TO MINIMAL NUMBER OF HOURS ALLOTTED

I. Four-hour teaching period each month.

1. First 4-hour period,
   a. Teaching to be done in out-patient chest clinic, a sanatorium, or as a last choice, a tuberculosis ward of a public hospital.
   b. First half-hour or hour to be spent in reviewing by means of seminars or discussions differential diagnosis of chronic lung conditions.
   c. Next 1½ to 2½ hours students under close supervision of instructor to study patients from standpoint of differential diagnosis based upon history, physical examination, chest x-rays, laboratory findings, and, if necessary, the clinical course.
   d. Remainder of the period—not less than one hour—devoted to selecting a group of patients, from 6 to 12 or more, in a sanatorium or on the cure somewhere who will represent the various stages and types of tuberculosis and who are to be followed on the cure throughout the year by being seen and studied each month.

   Note: At the outset every effort should be made to acquaint the students with all the different phases of each case, including their temperament and disposition. Hereafter, we will refer to these patients as "the patients under continuous, prolonged observation."

2. Second 4-hour period,
   a. First ½ to 1 hour devoted to further discussion or seminar on differential diagnosis of pulmonary tuberculosis pointing out especially the differential diagnosis of primary and secondary tuberculosis.
   b. 1½ to 2 hours during which students study patients from the standpoint of differential diagnosis under close guidance and supervision as was done in the last period. The work should be arranged so that cases of primary tuberculosis are available for study.
   c. During the last hour the time should be spent under close guidance of the instructor in observation and study of the patients under continuous, prolonged observation.

3. Third 4-hour period,
   a. First hour: Discussion or seminar on the prognosis of pulmonary tuberculosis.

   Note: Importance of mental and emotional control of the patients in determining the prognosis should be stressed.
   b. Two hours spent in studying patients in out-patient clinics, sanatorium, or tuberculosis wards who have been on the cure for a considerable time.

   Note: An attempt should be made to correlate the various phases of tuberculosis and to point out their bearing on the prognosis as well as to make clear the uncertainty of definite prognosis in the disease.
   c. One hour to be spent with the "patients under continuous and prolonged observation."

4. Fourth 4-hour period,
   a. One to two hour discussion or seminar on the treatment of pulmonary tuberculosis.

   Note: The factors involved in the so-called dietetic, hygienic, rest regimen and home versus sanatorium treatment should be the topics for consideration.
   b. One to two hours spent in observing and studying patients either in an out-patient clinic, a sanatorium, or a special ward for tuberculous patients who are either on the "cure" or who have left the "cure" and are being followed up.
   c. One hour spent with "the patients under continuous, prolonged observation."

5. Fifth 4-hour period,
   a. One to two hours in discussion or seminar on the medicinal and symptomatic treatment of tuberculosis and the consideration of climate and heliotherapy in connection with the treatment of this disease.
   b. One to two hours to be spent in observation and study of patients who are on the "cure" and who have left the "cure" with special reference to the above named factors.
   c. One to 1½ hours (depending on the amount of time left) devoted to the "patients under continuous, prolonged observation."
6. Sixth 4-hour period,
   a. 3 to 3½ hours during which students are to accompany public health or visiting nurses, with the instructor when possible, out into the community where they will have an opportunity to observe case-finding, home treatment and social aspects of tuberculosis.
   b. Time should be arranged so that the "patients under continuous, prolonged observation" may be seen, if only for a short time, so as not to lose continuity of observation and the interest of the student.
7. Seventh 4-hour period,
   a. 1½ hours discussion or seminar on pneumothorax, intrapleural pneumolysis, oleothorax, phrenic neurectomy, and closely allied surgical procedures used in the treatment of pulmonary tuberculosis. The treatment of tuberculous empyema should be included in this discussion.
   b. 1½ hours for the study of patients either in an out-patient chest clinic, in a sanatorium, or in a special tuberculosis ward of a public hospital who have received the above types of treatment.
   c. The fourth hour is to be spent with the "patients under continuous, prolonged observation."
8. Eighth 4-hour period,
   a. One to two hours for discussion or seminar on thoracoplasty and its various modifications. A discussion of other surgical procedures used in the treatment of pulmonary tuberculosis and not already covered in the course should be included. Brief reference should be made to such surgery on non-tuberculous pulmonary conditions that has not been incidentally covered in the past.
   b. One to two hours for study of patients in out-patient chest clinic, a sanatorium, or in a special tuberculosis ward of public hospital of patients who have received the type of treatment under consideration during this period.
   Teaching the student the technique of these operations is not so important as is the teaching of the possibilities that can be obtained by carefully selected, ably operated cases.
   c. The fourth hour to be spent with the "patients under prolonged, continuous observation."
9. Ninth 4-hour period,
   a. Two hours of discussion or seminar covering a summary of the work during the medical course on tuberculosis.
   Note: During this session the students should be made to realize that they are not supposed to be specialists in chronic diseases of the chest but that they should be tuberculosis conscious. They should also be made to understand that tuberculosis is a possibility in every case that may consult them and that their responsibility will rest in their demonstrations of their appreciation of the technique and value of an efficient case-finding program, and the technique and value of early, intensive treatment.
   b. Two hours to be devoted to the study of the "patients under continuous, prolonged observation" from the standpoint of original diagnosis, treatment, and clinical course to date.

WE NEED MORE MINERAL COUNTIES—*Continued from page 198.*

most age groups throughout the country. Indeed, in many rural and sparsely populated areas, twenty-five per cent would be a rather high figure.

To prevent infection by the tubercle bacillus is today one of the staunchest planks in our platform for tuberculosis control. It has been stated recently by an outstanding observer that 8 to 10 per cent of all those infected, ultimately die of tuberculosis. The infected child of today is the sick open case of tomorrow. These children are infected in most instances by their usual adult contacts. These contacts in a large measure are found among parents, school teachers, domestic servants, janitors, etc.

Congratulations Mineral County of West Virginia. We need more like you.

C. H. H.

Cerebral Air Embolism, Subcutaneous Emphysema, and Spontaneous Pneumothorax in a Tuberculous Patient

Report of an Unusual Case*

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A review of the literature makes it evident that the simultaneous occurrence of spontaneous pneumothorax, subcutaneous emphysema, and air embolism complicating pulmonary tuberculosis is a rare condition. Such a condition is reported in detail, not only because of its rarity, but also because of its physiological and pathological interest.

Bruns in 1930[1], reports a study of sixteen cases of air embolism with seven deaths in 12,700 therapeutic pneumothorax treatments. McCurdy in 1934[2], reports one case of air embolism following a therapeutic pneumothorax. Hamilton and Rothstein in 1935[3], report nine cases of air embolism following therapeutic pneumothorax in their large series of cases. Anderson in 1936[4], states that the incidence of air embolism in therapeutic pneumothorax is one in every 1000 to 2000 refills. He goes into a detailed description of the symptoms, signs, and pathology of the condition. Hartley and Yorkoff in 1938[5], report in detail two cases of air embolism; and Blumberg in 1933[6], 3 cases in patients receiving therapeutic pneumothorax. Chase in 1934[7], quite definitely proved the existence of air embolism by his striking experiments.

Dobbie in 1936[8], Chenebault and Marre in 1938[9], and Aznarez in 1938[10], report one case respectively of subcutaneous emphysema and spontaneous pneumothorax complicating pulmonary tuberculosis.

Myers, Levine, and Leggett in 1938[11], presented a comprehensive paper on the subject of air embolism and spontaneous pneumothorax complicating artificial therapeutic pneumothorax, but they cited no incidence where air embolism, subcutaneous emphysema, and spontaneous pneumothorax occurred simultaneously in a patient not receiving pneumothorax therapy.

Clinical Abstract

The patient, C. G., a 41 year old male negro prisoner was admitted on March 6, 1939, complaining of:

1. Cough; 2. Loss of weight; 3. Expectoration; 4. Hemoptysis; 5. Weakness.

History of Present Illness: The patient states that he was quite well until September, 1938, when he began to cough, lose weight, and feel weak. The cough persisted, became worse, and productive of white sputum. On occasions, the sputum was bloody. He showed breathlessness on exertion for three months and night sweats for two weeks. He has been unable to do any work for one month because of weakness. There has been a known loss of twelve pounds in weight in the past three weeks.

Family History: No tuberculosis.

Past Medical History: Essentially negative.

Habits: A heavy drinker and smoker.

History by Systems: Essentially negative.

Physical Examination: The pupils react to light and accomodation. The extra-ocular muscles function normally. Percussion of the chest shows impaired resonance over the right upper lobe area anteriorly and posteriorly. There are many squeaky rales through out both lungs, most marked over the right upper lobe area. Blood pressure is 108/70. There is no enlargement of the heart or abnormality of sound or rhythm. The residual portion of the physical examination was essentially negative.

Impression: Pulmonary tuberculosis bilateral far advanced with cavitation of the right upper lobe.

Roentgen Examination 3/5/39: Irregular density and mottling over entire right lung field. Numerous radiolucent areas due to cavi-

* From the Service of Dr. Nathan Blumberg, The Philadelphia General Hospital, Philadelphia, Pa., August, 1939.
Necropsy by Dr. William Ehrich, Visiting Pathologist at the Philadelphia General Hospital.

tation. Early bronchogenic spread to middle portion of left lung. Heart not enlarged or displaced.

Impression: Fibroulcerative tuberculosis-right.

Laboratory: Sputum negative for Tubercle Bacillus. Kahn negative. Blood Sugar 77 mg.% Blood Urea 10 mg.%

Progress Notes

3/10/39—Therapeutic Conference: Treatment to be bed rest for the time being.

5/4/39—Therapeutic Conference: Advised therapeutic pneumothorax on right.

5/18/39—On three separate occasions artificial pneumothorax attempted, but no pleural space could be found, and therefore was discontinued. Patient was placed on bed rest.

6/19/39—Patient developed a generalized edema of the face, back, penis, and ankles. The abdomen was distended with fluid. The liver was not palpable, there was no venous engorgement, and the cardiac examination was negative. Blood Pressure 105/70. He also complained of nocturia 4-5 times.

Laboratory: Urine—albumen 3 plus, hyaline and granular casts.

Blood: RBC 3,980,000; Hemo. 9.5 gm.; WBC 23,700; Polys 60; Lymph 34; Mono 2; Eosin 4. Total Protein 4.1; Album. 2.3; Glob. 1.8; A/G 1.2. Congo Red test showed disappearance of the dye to be 70 per cent.

Impression: 1. Nephrotic syndrome; 2. Amyloid disease of the kidneys; 3. General amyloidosis; 4. Chronic far advanced pulmonary tuberculosis.

Therapy: Restrict fluids, no salt, high protein diet, mercupurin.

7/14/39—Edema has entirely disappeared. Patient's general condition seems improved. Mercupurin stopped, but continued on low fluids and salt restriction.

7/24/39—At 6:30 p. m. the patient was found leaning against the wall in the bath room. He was in a confused state. He was placed in bed by the nurse. Examination at 6:45 p. m. revealed a stuporous patient lying quietly in bed experiencing some difficulty on inspiration. The respiratory rate was not increased. He responded slowly to questions and did not complain of pain. Physical examination showed extensive subcutaneous emphysema over the right anterior chest, neck, face, right arm, and right leg. Crepitation was felt in all these areas. There was marked ballooning of the scrotum. It measured 20 cm. in diameter and was tympanitic on percussion. The chest was hyper-resonant throughout, even over the precordial area. The left pupil was relatively enlarged, neither pupil reacted to light or accomodation. There was a horizontal nystagmus. The right arm and right leg showed a complete motor paralysis of all muscles. The tendon reflexes were absent and there was a positive Babinski on the right.

Impression: 1. Spontaneous pneumothorax; 2. Subcutaneous emphysema; 3. Right hemiplegia due to air embolism to left cerebral area.

7/25/39—*Neurological Consultation:* Patient shows right hemiplegia, partial aphasia, and no hemianesthesia.

Impression: The sudden appearance of right hemiplegia with subcutaneous emphysema and evidence of massive collapse points to air embolism as a causative factor of this patient's hemiplegia. Cerebral thrombosis must be ruled out however.

7/25/39—*Roentgen Examination:* There is extensive subcutaneous emphysema throughout the tissues of the neck and thorax. Considerable irregular density over the entire right lung and probably a pneumothorax on this side. No definite involvement on the left side at this time. Heart is not displaced.

Impression: Extensive subcutaneous emphysema with spontaneous pneumothorax.

7/26/39—Spread of emphysema over the left thorax and left leg. Blood Pressure 80/60.

7/28/39—Patient gradually becoming more stuporous. Death.

Clinical Diagnosis: 1. Pulmonary tuberculosis bilateral far advanced with cavitation of the entire right lung; 2. Amyloid disease of the kidney; 3. General amyloidosis; 4. Spontaneous pneumothorax right; 5. Subcutaneous emphysema; 6. Air embolism (cerebral); 7. Right hemiplegia.

Necropsy Report

External Examination: The body is that of a moderately well nourished, 41 year old, black male, of large stature. The skin is emphysematous throughout, with the exception of that of the left arm. The scrotum and penis are tremendously emphysematous. The superficial lymph nodes are not palpable.

Internal Examination: The right pleural cavity is partially obliterated by dense fibrous adhesions, the free part contains air and purulent material; the left pleural cavity is free of adhesions. It contains about 200 cc. of a slightly purulent fluid and air. The pericardial sac contains a great deal of a slightly purulent fluid and the abdominal cavity contains 600 cc. of a markedly purulent fluid.

Heart: Weighs 210 gms. The pericardial surface is smooth. The myocardium is moderately firm. The ventricles are not dilated and contain no air. Ostia and valves are not changed. The myocardium is of normal color and is free of scars. The coronary arteries are not altered.

Aorta: Apparently not changed.

Lungs: Left weighs 920 gms., right 610 gms. The right lung is partly destroyed by cavities which are found throughout all lobes. The remaining tissue of the right lung is indurated and shows many patches of mottled grayish white tubercles throughout both lobes. The left lung contains air in most places, and many small patches of gray tubercles throughout both lobes. The bronchial lymph nodes are enlarged and caseous. The bronchi contain some purulent material. The pulmonary vessels are not altered.

Spleen: Weighs 250 gms. The surface is covered with strands of fibrin. The consistency is rather firm and the mahogony brown cut surface shows several whitish-yellow nodules.

Kidneys: Weigh 210 gms., each. The capsules strip easily leaving cortical surfaces which show a few yellowish gray nodules. The cortex is much enlarged, yellowish in color and well demarcated from medulla. The pelves and ureters are essentially normal.

Urinary Bladder: Contains very little urine. The mucosa is not altered.

Genitalia: The right testis shows several scarred areas.

G. I. Tract: This is in an advanced state of autolysis. On the lesser curvature of the stomach there is a round ulcer, the largest diameter of which measures 0.6 cm. There are several irregular ulcers with yellowish nodules in their base in the ileum.

Large veins: Contain little blood.

Liver: Weighs 1280 gms. The capsular surface and cut surface show a number of small yellowish gray discrete nodules. Otherwise, the liver is in an advanced state of autolysis. The gall bladder contains a small amount of brown bile. The bile ducts are patent.

Pancreas: This is in an advanced state of autolysis.

Adrenals: These are of usual size. The lipoid in the cortices is rather well preserved.

Brain: Weighs 1160 gms. It shows encephalomalacia in the distribution of the left anterior recurrent artery of Huebner. There are anomalies of the circle of Willis.

Pathological Diagnosis

1. Marked subcutaneous emphysema over entire body with exception of left arm; pyopneumothorax bilateral, purulent pericarditis and peritonitis; extensive fibrous pleural adhesions.
2. *Heart:* Moderate atrophy.
3. *Aorta:* Apparently normal.
4. *Lungs:* Chronic pulmonary tuberculosis with widespread cavitation in right lung and widespread, chiefly bronchogenic, extension in both lungs; caseous tuberculosis of bronchial lymph nodes.
5. *Spleen:* Tuberculosis; amyloidosis.
6. *Kidneys:* Amyloidosis; lipoid nephrosis; tuberculosis.
7. *Bladder:* Apparently normal.
8. *Genitalia:* Scars in right testis.
9. *G. I. Tract:* Autolysis; small peptic ulcer of stomach; multiple tuberculous ulcers in ileum.
10. *Liver:* Autolysis; tuberculosis.
11. *Pancreas:* Autolysis.
12. *Adrenals:* Apparently normal.
13. *Brain:* Encephalomalacia—distribution of left anterior recurrent artery of Huebner. Anomalies of circle of Willis.

Summary

An unusual case of spontaneous pneumothorax, subcutaneous emphysema, and cerebral air embolism is presented. These conditions were not due to any mechanical interference or induced by artificial pneumothorax therapy.

1922 Spruce Street.

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Tuberculosis Among Nurses

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Robert Koch was probably one of the first to interest the profession in this problem of tuberculosis among nurses. Upon his suggestion, a survey was made in Germany of the hospitals, clinics, and sanatoria from 1906-1910. It was learned that, "in the general hospital . . infections of physicians and nurses were about four times as frequent in the special tuberculosis wards as in the dispensary departments"[1].

The problem was more forcibly brought to the attention of the profession by Heimbeck in Oslo, Norway, when in 1927 he published figures showing that only about one-half of the nurses entering training in the Oslo General Hospital were tuberculin-positive; and further, that the negative reactors contracted the active disease with far greater frequency than did the initially positive reactors[2].

In 1928 Shipman and Davis at the University of California Training School for nurses reported on a three year study, after observing a sharp increase in the incidence of the disease during the preceding years. A laudable health program was instituted for the nurses with frequent physical and roentgenological examinations. There was a corresponding sharp decrease in the incidence of the disease[3].

There was a very able and practical discussion of the problem by J. A. Myers in 1930, when changing opinions were expressed and new concepts in the light of recent works were pronounced[4]. He cited Braeuning's study in Germany on eighteen nurses whose past health had been perfect, but who had pulmonary tuberculosis at the time of the study. Fifteen had nursed tuberculous patients. Myers very aptly said: "The greatest of all causes for the high incidence of tuberculosis among nurses is the exposure they suffer to the disease while in hospital or school residence."

That the disease exists among nurses to a far greater extent than one would anticipate, was made clear in a report by the Relief Fund Committee of the American Nurses Association in 1930. This report, covering twenty years (from 1911 to 1930), showed that of the 543 nurses receiving aid from the Association for illnesses, 48 per cent, or nearly one-half had tuberculosis[5].

Investigating the incidence of tuberculosis among nurses at the Ancker Hospital in St. Paul, Geer[6], in 1932, observed that the previous nine year period showed three times the normal expected incidence among young women of the same age group. Intracutaneous testing was begun, with positive reactors having roentgenograms of the chest taken. It was found that about 30 per cent of the nurses were positive reactors on entering training while nearly 100 per cent were positive on graduation. A rigid program of aseptic nursing technique was instituted. From September 1930 to September 1934 the incidence of the disease dropped sharply. The three

nurses who contracted the disease in that period were all initially negative reactors to old-tuberculin.

A five year study was instituted at Bellevue Hospital in New York City in February 1931. The program was very comprehensive, intelligent, and encouraging[7]. During this period, it was found that of the 539 candidates for admission to the school of nursing, 58 per cent were positive reactors to old tuberculin. The majority became positive during their period of training. Eight cases of tuberculosis were detected by routine roentgenological examination, six with pulmonary lesions, none being aware of any symptoms suggestive of tuberculosis. In none of the cases was the diagnosis suggested by the findings six months previously. Of the eight cases, six were initially negative reactors. Because of early diagnosis, treatment was conservative and prognosis good in all cases.

At the Boston City Hospital a similar study was instituted in 1932 by Badger and Spink[8]. Their findings were quite similar to the Bellevue study. During the five year period, of the 470 nurses admitted to training, there were 58 per cent initially positive reactors. Nearly all the nurses were positive reactors at graduation. Eight cases of tuberculosis were detected, seven of which were initially negative reactors.

Again in 1938, J. A. Myers[9] (and co-workers) reported findings on tuberculin testing in three schools of nursing, with the school of Education at the University of Minnesota used as a control. All four groups showed essentially the same percentage (24 per cent) of initially positive reactors to old tuberculin. After a four year course the controls showed only 28.5 per cent positive reactors, while two of the schools for nursing showed 35 per cent and 43.5 per cent respectively. These figures are in marked contrast to the third school of nursing which had three months tuberculosis service in which the nurses were 94 per cent positive reactors upon graduation over a nine year period.

Soper, in New Haven[10], who for some years has been interested in tuberculosis among nurses and medical students, reports that in the Yale School of Nursing from 1930-1937 there were six cases of tuberculosis out of 385 having admission roentgenograms of the chest. Of 191 graduates over a five year period, x-rayed at graduation, there were two cases detected, both of a minimal nature. The nurses have a tuberculosis service and less than a month is spent in a sanatorium. The average age is 23.

Case Studies

Herewith are presented 25 cases of active pulmonary tuberculosis among student and graduate nurses from 21 general hospitals. The diagnosis in each case was established beyond doubt, and made either from sputum studies, roentgenographic evidence or both. An intimate study of personal habits and symptomatology was made, together with positive evidence of contact with a tuberculous individual. All the cases were patients in the same sanatorium[11] at the time of the study, and constituted over 5 per cent of the total census.

The train of symptoms was closely investigated in all cases and the approximate dates compared with their professional status, the following facts being elicited:

a. Two nurses had frank symptoms, one positive evidence, of pulmonary tuberculosis one year prior to beginning of training.

b. Eleven nurses began their symptoms during training. When admitted to the sanatorium, eight were far-advanced.

c. Twelve nurses began their symptoms on the average of eight years after graduation.

d. The average age for all the cases was 28 years.

Clinically the whole group was classified as follows:

a. Eighteen were far-advanced (75%).

b. Four were moderately advanced (17%).

c. Three were diagnosed as Minimal Tuberculosis (8%).

Three of the far-advanced cases were complicated by another disease, one by a positive Wassermann, one by diabetes mellitus, and one by epilepsy. The syphilis could not be treated adequately due to the production of an extreme generalized weakness. The diabetes was controlled with insulin and dietetic management. The epilepsy was effectively controlled with daily doses of phenobarbital. Of the three patients, only the epileptic did well, the other two becoming progressively worse with their tuberculosis.

Therapeutically, fifteen of the eighteen cases of far-advanced disease received effec-

tive pneumothorax treatment, with three having to submit to intra-pleural pneumonolysis in order to achieve this end. By effective pneumothorax is meant the conversion of the sputum from positive to negative, and the roentgenographic obliteration of the parenchymal excavation.

Two cases, on whom artificial pneumothorax was attempted and where it failed due to intrapleural adhesions, were forced to undergo thoracoplasty, one a two-stage; the other a three-stage, in order to obtain an effective collapse and convert the sputum.

The last case with far-advanced disease suffered an air embolus during an attempt to induce artificial pneumothorax, the immediate effects of which were a flaccid paralysis of the lower extremities, with incontinence of feces and urine. After fifteen months of bed rest, her phthisis and lower motor neurone paralysis had improved remarkably, so that she was being elevated "in the classes."

Contact

All the nurses have a positive knowledge of contact with a known tuberculous individual during or subsequent to training, although none of the nurses were on a tuberculous service or were affiliated with a sanatorium. In no hospital were these contacts isolated, and in only two was contagious technique attempted, and here, the wearing of masks was "optional." In none of the hospitals was the tuberculin test done on probationers, and in only one instance was a routine chest roentgenogram employed on nurses beginning their training. There were four "family histories" of tuberculosis among this group.

In regard to contact, the cases of five of the group are taken as typical:

1. One graduate, with far-advanced disease, and a successful right pneumothorax, said that all through training there were "breakdowns" throughout the hospital twice each year, one each spring and fall, with ten in all during a five year period. A pathologist died of the disease, as did an office employee, while a negress employed in the diet kitchen "broke down." Three student nurses and three graduates contracted the disease, while an interne was forced to "go on the cure" with far-advanced disease. When a nurse was found to have tuberculosis, the room-mate of the tuberculous individual was forced to have a roentgenogram of the chest, but for others, either in the school of nursing or in any other department, it was not suggested. At that hospital there still does not exist tuberculin testing or roentgen-examination of the chests of probationers, as a routine procedure.

2. Another graduate nurse, who was forced to undergo thoracoplasty, said in regard to contact: That there was a physician on the staff who was a former sanatorium patient, who had cough, sputum, and hemoptysis. At times, he would be forced to bed because of weakness, and it was found at these times that his sputum was positive for tubercle bacilli. Ultimately he was forced to have a thoracoplasty. Five nurses have "broken down" in the hospital, two of these in this series of cases.

3. Another graduate said that there were frequently six or seven tuberculous patients on the ward simultaneously awaiting entry into a sanatorium. There were no precautions required of the nurses.

4. One student nurse, 17 years of age, and 1½ years in training, nursed three cases of pulmonary tuberculosis with positive sputums in as many months without precautions of any kind. During the fourth month she, herself, contracted a heavy "chest cold," characterized by cough and sputum. Her strength and appetite diminished, and she was forced to bed. Her sputum was found to be positive for tubercle bacilli, and the roentgenogram showed a basal pneumonitis.

5. Another student nurse, with far-advanced disease said that during her 18 months training period, she roomed with another student who "broke down" with tuberculosis. She, and the remainder of the group, had no subsequent roentgenograms of the chest. Her own disease was only detected by hemoptysis with positive sputum.

Background and Training

All of the group save two were rural born and received their preliminary education in rural districts. All were native born Americans, and of the white race. The course of nursing in all cases lasted three years. In regard to the food during training, the group was about equally divided as to "good" and

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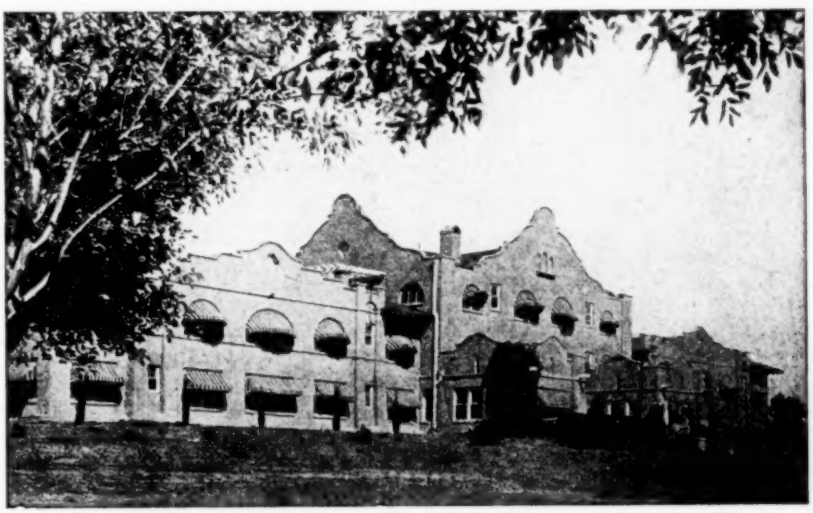

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"fair." The hours worked were 12, including classwork. The two-three "hours-off" was usually consumed in classwork. In regard to sleep: Only three patients could say that they averaged over eight hours per night during training. Fifteen said that it was "nearly eight hours," and that they always had a room-mate. Five had a room alone, while five others had three or more room-mates. All were temperate in their habits. Many felt that the 12 hour duty was too long, and that much of that time was consumed doing menial tasks, in contrast to actual nursing experience, and text-book study.

Discussion

Before, we have cited[12] that the greatest single factor in the spread of this disease is contact. This applies to nurses no less than it does to laymen; and even to a greater degree, being exposed as they are to known cases; and many others who have the active disease unrecognized. That strict precautions with contagious technique, and isolation, should be employed by the general hospitals is imperative. That instruction in the vicissitudes of this disease should come from an active phthisiologist is quite fitting. That this program can be well balanced by tuberculin-testing all candidates for training; and in having roentgenological examinations of the chest of all probationers, and routinely every four months, goes without saying.

It is a moot question whether or not a tuberculosis service or a sanatorium affiliation is desirable for training, when one observes the high incidence of acquired infections among student nurses. It is well known that the older nurses in the fourth and fifth decades of life rarely "break down" even after a long exposure in a tuberculosis sanatorium. The average tuberculous patient requires simply: general nursing care under precautions. Would it not be more profitable for the training school to affiliate, if they must, with a psychiatric institution, where the student would gain a very useful experience. It seems to us that to put a nurse in her 'teens or early twenties, on a tuberculosis service, or in a sanatorium, particularly one who is tuberculin-negative, is courting disaster.

Even with the diminution of the incidence of the disease, pulmonary tuberculosis is a distinct occupational hazard among nurses, and more so each year, when it appears that the incidence of tuberculin-negative probationers is on the increase. That this disease is now the greatest hazard in nursing is recognized by many, when one observes how diptheria, typhoid, smallpox, lues, and other communicable diseases have been wiped out, and pneumonia, meningitis, and streptococcal infections are amenable to treatment. The tubercle bacillus stands alone not only in the chronic recurring disability for which it is responsible, but in being resistant and non-responsive to all forms of therapy save surgical collapse and compression of the parenchymal lesion.

For over two years at the Minneapolis General Hospital, all patients admitted have been tuberculin-tested with the positive reactors having roentgenograms of the chest. This is indeed a progressive step in prevention of the disease for it is the unrecognized cases which are such a menace to the health of the nursing and medical personnel of the metropolitan general hospitals.

The eight hour working day for the student nurse is becoming more universal, and at no loss in institutional efficiency. It is more generally recognized that the health of the student nurse is the direct responsibility of the hospital employing her, and that recreation facilities are part of the advantages which she should have. Their health program is being carried out in many instances by an officially appointed internist who has a bent toward preventive medicine, and who bears the responsibility for their health during training.

In summary and in conclusion: Tuberculosis among nurses, as in the general population, is a communicable, but preventable disease. Schools of Nursing must recognize this by the institution of proper nursing technique and instruction befitting an infectious disease. The health of the student can only be maintained by regular, periodic, and appropriate examinations designed to prevent the occurrence of such a hopeless disability as far-advanced pulmonary tuberculosis.

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Organization News

STATE SOCIETIES

At a meeting called by Dr. Robert K. Campbell, Governor for Illinois of the American College of Chest Physicians, at the University Club, Peoria, at noon, May 21, 1940, the Illinois State Society of the American College of Chest Physicians was organized.*

ARTICLE I.

1. NAME: The name of the State Society shall be The Illinois State Society of the American College of Chest Physicians.
2. MEMBERS: All members of the American College of Chest Physicians residing in Illinois automatically become members of The Illinois College of Chest Physicians. No others admitted.

ARTICLE II.

1. CONSTITUTION AND BY-LAWS: The Constitution and By-Laws of The American College of Chest Physicians applies to all members of The Illinois State Society of the American College of Chest Physicians.

The following applies only to The Illinois State Society of the American College of Chest Physicians:

ARTICLE III—OBJECTS:

The objects of the State Organization shall be to bring the members together for the purpose of promoting increased good fellowship and a better understanding of scientific and economic conditions through scientific programs and a discussion of economics as related to the care of chest diseases.

ARTICLE IV—OFFICERS and MEETINGS:

1. There shall be three meetings each year. The annual meeting of this society shall be concurrent with the meeting of The Illinois State Medical Society. This shall be a business meeting and the officers of the society, consisting of President, Vice-President and Secretary shall be elected for the ensuing year.
2. There shall be a meeting in Chicago and a meeting down-state during the year as arranged by the officers of the society.

The present members of The American College of Chest Physicians residing in Illinois and forming this society shall be considered charter members of The Illinois State Society of the American College of Chest Physicians.

There shall be no dues in this State Society.

For the election of officers, Dr. Robert K. Campbell was nominated by Dr. Schlack, seconded by Dr. Palmer, as President. As Vice-President Dr. Schlack was nominated by Dr. Joannides, seconded by Dr. Webb. For Secretary Dr. Palmer was nominated by Dr. Schlack and seconded by Dr. Klein. These candidates were elected without opposition.

It was moved by Dr. Schlack and seconded by Dr. Webb that the President endeavor to avoid conflicting dates in the future with the meetings of the National Tuberculosis Association; the American Trudeau Society; The American College of Chest Physicians and the American Medical Association.

On informal discussion, it was agreed that the next meeting should be held in Chicago during the autumn or early winter, possibly in connection with the Chicago Tuberculosis Society.

The New York and New Jersey Fellows of the College met at a joint dinner meeting, held at the Biltmore Hotel, New York City, June 10, 1940 and organized the New York State Society of the American College of Chest Physicians and the New Jersey State Society of the American College of Chest Physicians.

The dinner meeting was addressed by Dr. Frank Walton Burge, Philadelphia, Pennsylvania,

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Chairman of the Board of Regents; Dr. Ralph C. Matson, Portland, Oregon, Past-President of the College, and Dr. John H. Peck, Oakdale, Iowa, President of the College. After the dinner meeting separate business meetings were held by the New York and New Jersey Fellows, respectively.

Dr. Edward P. Eglee, New York City, Regent of the College for District 2, presided at the New York Meeting; Dr. Lyman I. Thayer, Glen Falls, New York, was Chairman of the Nominating Committee. The following officers were elected:

Dr. Edgar Mayer,
New York City, President.
Dr. Nelson W. Strohm,
Buffalo, Vice-President.
Dr. Arthur Q. Penta,
Schenectady, Secretary.

Dr. B. L. Chipley, Paterson, New Jersey, presided at the New Jersey Meeting. Dr. M. W. Newcomb, Governor of the College for the State of New Jersey was unable to attend due to illness. Dr. James M. Fine, Newark, was Chairman of the Nominating Committee.

The following officers were elected:

Dr. Martin H. Collier,
Grenloch, President.
Dr. Joseph C. Morrow,
Ridgewood, Vice-President.
Dr. Chas. I. Silk,
Perth Amboy, Secretary.

All of the above state societies will meet annually with their state medical societies.

ELECTION RESULTS — 1940 MEETING

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President-Elect,
Benjamin Goldberg, M.D., Chicago, Illinois.
First Vice-President,
J. Winthrop Peabody, M.D., Washington, D. C.
Second Vice-President,
M. Jay Flipse, M.D., Miami, Florida.
Secretary-Treasurer,
Paul H. Holinger, M.D., Chicago, Illinois.

Regents

Regional District		*Term Expires*
No. 2	Edward P. Eglee, M.D., New York, N. Y.	1943
No. 5	Joseph C. Placak, M.D., Cleveland, Ohio	1943
No. 9	Andrew L. Banyai, M.D., Wauwatosa, Wisconsin	1943
*No. 14	Grover C. Bellinger, M.D., Salem, Oregon	1943

Governors

	Term Expires
Delaware Gerald A. Beatty, M.D., Wilmington	1943
**Florida Arnold S. Anderson, M.D., St. Petersburg	1941
*Indiana Jas. H. Stygall, M.D., Indianapolis	1943
*Iowa J. Carl Painter, M.D., Dubuque	1943
***Kansas Forest L. Loveland, M.D., Topeka	1941
*Kentucky Paul A. Turner, M.D., Louisville	1943
*Montana Frank I. Terrill, M.D., Deer Lodge	1943
*Nebraska John F. Allen, M.D., Omaha	1943
*New Hampshire Robert B. Kerr, M.D., Manchester	1943
*New Mexico LeRoy S. Peters, M.D., Albuquerque	1943
**New York George Ornstein, M.D., New York	1942
**Ohio Louis Mark, M.D., Columbus	1941
*Oklahoma Robert M. Shepard, M.D., Tulsa	1943
Oregon Jas. M. Odell, M.D., The Dalles	1943
Pennsylvania John H. Bisbing, M.D., Reading	1943
*Rhode Island Ubaldo E. Zambarano, M.D., Wallum Lake	1943
South Carolina Leo F. Hall, M.D., State Park	1943
Wisconsin Walter C. Reinking, M.D., Madison	1943
U. S. Possessions	
*Philippine Islands Miguel Canizares, M.D., Manila	1941
*Puerto Rico Jacob Smith, M.D., Rio Piedras	1941
Foreign Countries	
*Australia John H. Blackburn, M.D., Queensland	1941
Canada H. A. Farris, M.D., St. John, N. B.	1941
*China Shu-Fan Li, M.D., Hong Kong	1941
*Cuba Antonio Navarrete, M.D., Havana	1941
*Equador Juan T. Marengo, M.D., Guayquil	1941
*India Jaharlal Ghosh, M.D., Calcutta	1941
*Norway Carl B. Semb, M.D., Oslo	1941

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*Present Incumbent.

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***One Year Term.